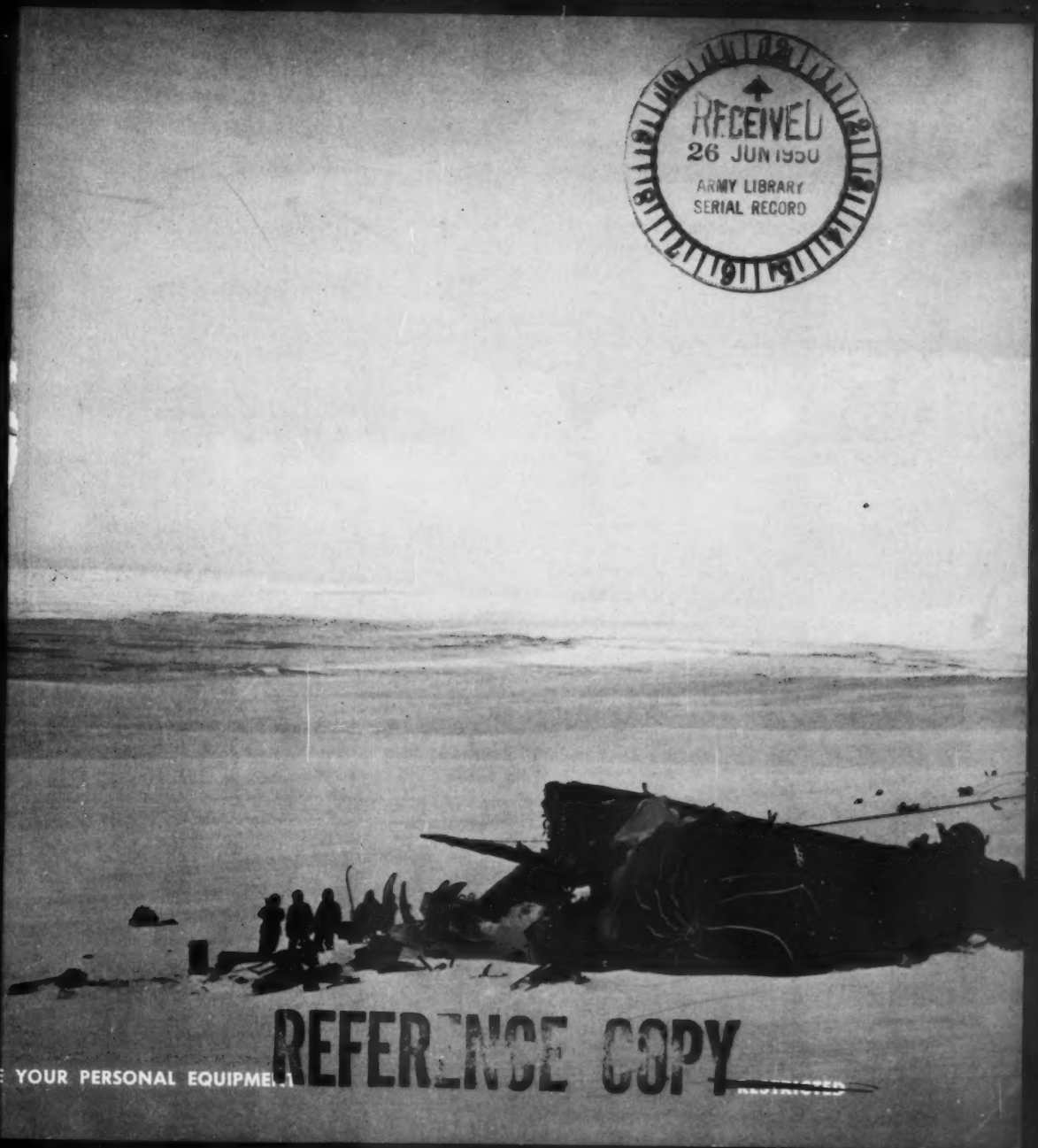
Flying Safety



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YOUR PERSONAL EQUIPMENT

CONSCIENTIOUS SKILL

STRATEGIC Air Command is more vulnerable to accidents than any other organization in the Air Force. The only thing missing from actual combat operations is that we are not being shot at with live ammunition. We operate under all conditions, in all weather, twenty-four hours a day. This makes an intensive flying safety program mandatory.

Flying safety in SAC is based on two principles. One is to make every member of SAC accident conscious. Two is to raise the level of technical knowledge of all personnel concerned with the operation of aircraft. Our accident rate has been reduced considerably during the last 18 months as a result of this two-fold program.

It has long been my belief that a great many accidents are caused by people who were qualified at one time but through lack of interest or a change in MOS have become unsafe. One of the purposes of ground training in SAC is to prevent accidents. This purpose comes from the belief that the more skillful a man becomes in his MOS the less vulnerable he is to accidents. One base in SAC teaches 45 different courses intended to increase the skill of the individual in his own MOS, rather than to teach him a new job.

Despite our program of accident prevention, accidents do occur. Provisions are made in the flying safety program to exploit the lessons of each accident to the maximum by converting it to flying safety knowledge. I require each Wing Commander to report to me in person with details of any accident which occurred in his organization. These details are assessed and the cause of the accident is established if possible. The information, along with suggested preventive measures, is dispatched to all SAC bases where it is circulated for the information of all personnel.

In the future we anticipate aircraft with speed and range more than double those of World War II. These aircraft have more complicated electronic equipment, armament and more sensitive sources of power. Tangible safety measures are being implemented at present for these new planes. Runway lengths are being increased, approaches improved and the aircraft equipped with better navigational equipment, brakes, ejection seats and other safety devices.

It is only common sense to lay a good foundation of intangible safety measures now. By intangible safety measures I mean the individual's feeling of personal responsibility and the measure of his technical knowledge. In order to operate the specialized high speed aircraft of tomorrow with an acceptable accident rate, we must place more emphasis on the intangibles of flying safety than ever before.

A consideration which must not be overlooked is that aircraft accidents are costly not only in lives and money, but they also reduce the combat potential of our Air Force—a factor of vital concern to every officer, airman and citizen.

Curtis E. LeMay

CURTIS E. LeMAY
Lieutenant General, USAF
Commanding, Strategic Air Command

USE YOUR PERSONAL EQUIPMENT

"Right scanner to pilot."

"Pilot to scanner, go ahead."

"Fire in No. 4 engine. Flames streaming back approximately 15 feet."

"Pilot to scanner, Roger."

This transmission was heard by the radar observer, who, in one sweeping movement, raked off the headset and clipped on the parachute lying on the table immediately in front of him. The copilot who was flying the airplane had his parachute on and fastened. In a less number of seconds than it takes to describe what happened, the right wing failed, disintegration followed, and two parachutes were seen to open.

Of the entire crew, only two men lived—the copilot and the radar observer. It is known that these two men had their chutes on or conveniently located at the time of the emergency. In the seconds between the reporting of the emergency and the breaking-up of the airplane, time lost in finding parachutes and getting into them allowed no emergency efforts, such as attempting to put out the fire. Before this could be done, the wing failed and the airplane was in two parts hurtling to the earth.

Flight personnel should be reminded of the provisions of AF Regulation 60-5 in regard to the wearing of parachutes or parachute harness while in flight.

Three survivors of a recent C-47 accident credit their survival to the wearing of parachute harness. The left wing of the plane burned through within two minutes after an engine fire was detected. During the two minutes after the pilot realized the fire was uncontrollable and gave the bail-out order, the two flight engineers and the copilot snapped chutes on their harnesses and abandoned the plane. As the copilot went out the door, he observed the pilot coming down the cargo aisle. The left wing separated from the plane immediately thereafter and the pilot did not escape. It is probable that none would have

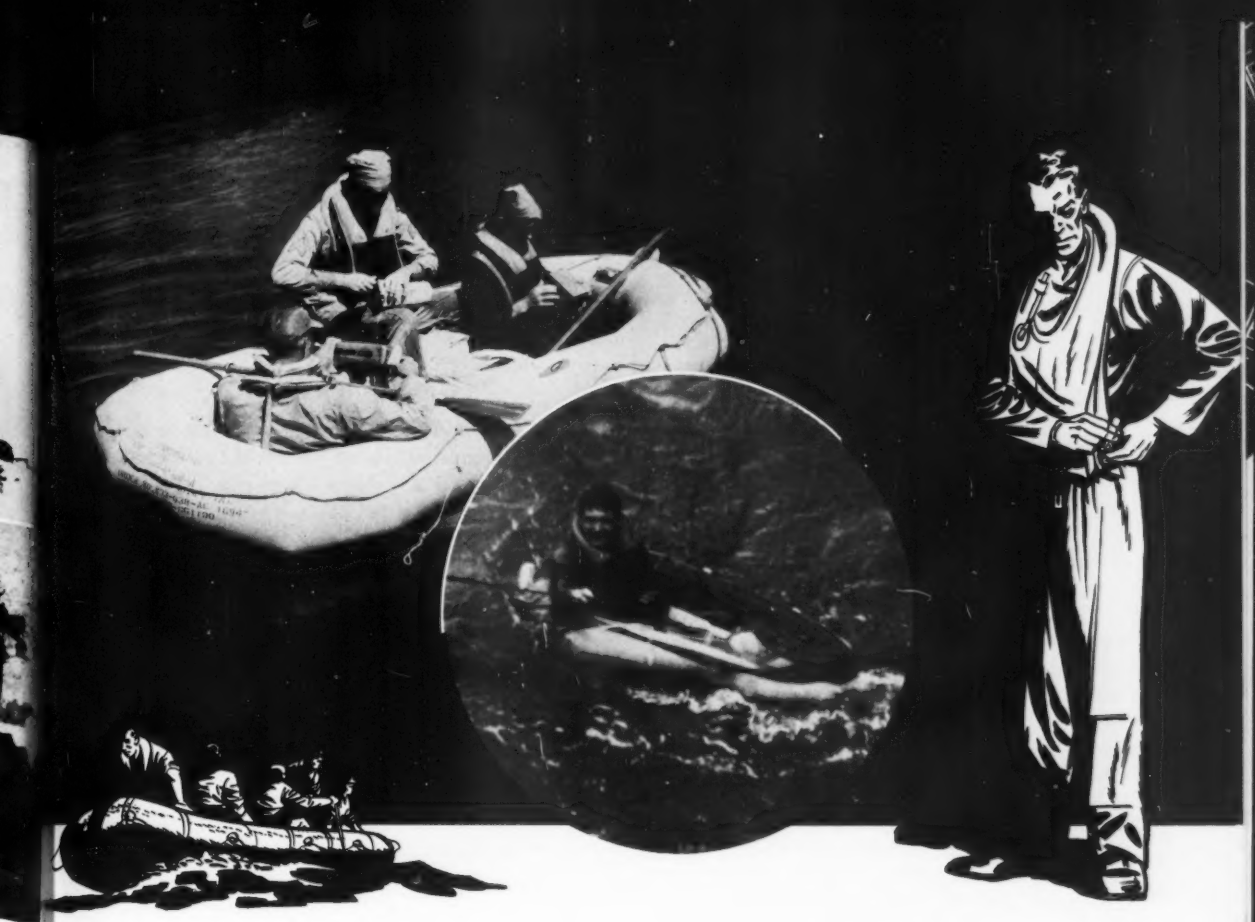
escaped, had it been necessary to climb into chutes after the emergency arose.

Then there was the C-45 that had to be ditched in one of the Great Lakes because the pilot neglected his fuel supply. Evidence indicated there was inadequate and insufficient life saving equipment on board. Less than six miles from shore the entire crew was drowned.

Such accidents as these emphasize once more that through the intimate knowledge and proper use of parachutes and other lifesaving equipment, injuries and death can be prevented in times of emergencies.

A study recently completed by the Directorate of Flight Safety Research of 320 bailouts is revealing. It shows that 140, or 44 per cent, resulted in death or injury. Contrasting this percentage with the less than one per cent injury and death record reported in jumps made by the 82d Airborne Division and by the Air-Sea Rescue Parachute Training Unit at MacDill Air Force Base, it is evident that serious consideration must be given to some program of parachute training for all Air Force personnel. Eighty per cent of the non-fatal injuries associated with all jumps resulted from landing impacts. All of the bailouts in the study occurred at altitudes below 25,000 feet. For this reason the loss of the oxygen mask was not a serious problem. No satisfactory method is known for retaining the oxygen mask when the crash helmet is lost. With higher altitudes being consistently flown, this good fortune is not likely to continue. The number of cases in which jet pilots lose their shoes has important significance when consideration is given to the necessity of their walking out of remote areas under various climatic conditions.

Proof of existence of anoxia and inadequacy of oxygen equipment is extremely difficult to obtain. Cases of suspected anoxia which occur in fighter aircraft are generally associated with complete destruction of the airplane and disintegration of the body. Anoxia occurring in bombers seldom produce fatal results because of the proximity of other crew



members who observe the difficulty and are able to take corrective action.

In an effort to determine more specifically how seats, seat belts, shoulder harness and crash helmets function in cases of fatal accidents, ten fighter accidents were selected. These accidents were selected on the basis that the lack of serious damage to the cockpit or cabin structure makes it possible to label these cases as "survivable" accidents. Forty per cent of the seats in these cases broke under impact. Only one case exists where the safety belt broke during impact, although in three cases the pilot failed to fasten the belt. Further, in both cases of fatal skull fractures, the shoulder harness was not fastened and the P-1 type crash helmet failed to protect the vital head area during the deceleration. The three cases of fatal injuries from generalized burns resulted when the pilots were forced to attempt escape from the aircraft by climbing out of cockpits which were not designed to aid rapid exit under emergency conditions.

It is true our personal equipment is not in the ultimate class or all that may be desired, and many people are working continuously and far into the night, attempting to improve existing personal equipment and replace that presently used with better types. But it is a poor excuse to neglect or fail to use properly the equipment we now have available. Foresight, including the wearing of all personal equipment designed for the safety and protection of air crews, in many an instance, has made it possible for the crews to "climb downstairs" and live.

In addition to the most important consideration, that you make proper use of emergency equipment to save your life today, we all have an obligation to save planes and lives in the future. When a man is killed in a crash, he may be the only person who could have told what caused the accident. If he survives a crash, investigators are furnished with information which may prevent future crashes. Safe flight tomorrow depends a great deal on the number of survivors today.

To
CAPT. CHARLES G. ALDOUS
Bergstrom AFB, Texas

CAPTAIN ALDOUS was flying as copilot in a Twin Mustang which was No. 3 position in a four-plane formation making a night, IFR round-robin flight. About 30 minutes out of Bergstrom on the return flight, the pilot attempted to contact Aldous on the interphone system. It had become inoperative. Several tries were made but they found they could talk only intermittently. Calls were made on the VHF, without reply. The pilot decided to stay with the flight leader and descend through the overcast with him for a letdown and landing, since the only radio equipment still working was the radio compass needle.

As the pilot gave his instruments a quick check, the flight leader started a right turn. Propwash caused the plane to go up on a wing tip, spilling the gyro instruments. All reference to the horizon was lost. The gyro compass spun and the horizon appeared lying on its side, bobbing up and down. The needle and ball were crossed. Realizing that the airplane was either in a spin or uncoordinated roll, the pilot made an attempt to recover after two or three spins or rolls, but without success. With the overcast only 4,000 feet below the formation, the pilot decided to abandon the airplane and he made one bail-out call to Aldous, after which he went over the right side, between the booms.

Captain Aldous' story follows:

"Due to failure of the interphone system, I didn't hear the bail-out order. We went through a lot of gyrations—I couldn't tell just what they were—but at one time I knew that we were on our back. I then saw the pilot leave the plane. Using needle and ball and airspeed, I executed an unusual position recovery.

"Deciding to stay with the plane, I tried to find the rest of the flight, without success. (No contact could be made on VHF.) After I had been alone in the plane 15 to 20 minutes, I decided to make a letdown, using the radio compass needle. The ceiling had previously been reported as 800 feet, so I flew northwest on top of the overcast. After a procedure turn I started my descent, breaking out contact about ¼ mile from the Austin Municipal Airport and flew contact to Bergstrom.

"I circled Bergstrom and pulled the emergency gear release, only to get a red unsafe light. I yanked the release and held it out, at the same time yawing and skidding the plane, but still the red unsafe light stayed on. The landing lights failed, but the taxi lights stayed on. Flashing these, I was able to attract the tower and received a green light to land. Continuing around the field, I tried to get the gear in the locked position, but found it would not lock. (There is no normal landing gear operating handle in the right cockpit, and the landing gear handle in the left cockpit was in the neutral position. When in neutral on pilot's side, emergency system can't be worked by copilot.) So I made a base leg and put down about 15 degrees of flap by the emergency system and made a normal approach.

"The plane touched and rolled about 400 feet. The gear slowly retracted and the plane skidded on the drop tanks. I stopped at the 1000-foot mark just in front of a runway control truck. I was shaken up a bit, but not hurt."

Captain Aldous was highly commended by the Commanding Officer of the 27th Fighter-Escort-Group and by his brother pilots for his good judgment and superior flying skill.

WELL DONE

To
1st LT. DON C. UPSHAW
18th FIGHTER BOMBER GROUP
Clark AFB, Manila, P. I.

A FLIGHT of 3 F-80's was topping the cumulus clouds at 38,000 feet en route to Luzon from Okinawa. When Lieutenant Upshaw attempted to transfer internal fuel, 250 miles from landfall, the transfer system was inoperative. After getting down to 40 gallons of remaining fuel, he called "Shark Bait," the call sign that he was in trouble, to a 2nd Rescue Squadron SB-17 following the flight. The decision was made to try to reach the northern tip of Luzon.

With the fuselage tank registering near "zero," the emergency by-pass system was turned to the "on" position, but no internal wing tank fuel was available. Lieutenant Upshaw passed over the Luzon coastline at 13,000 altitude. Any instant now he expected the flame-out.

Lt. V. G. Stewart, the flight leader, led the fuel-starved jet over the mountains en route to an emergency landing strip on northern Luzon.

Thirty-five miles northeast of Laoag, the anticipated flame-out occurred. The flight leader reduced power to idle and glided ahead of Lieutenant Upshaw, topping the build-ups over the mountains. When the Jets were down to 5000 feet, the field came in sight.

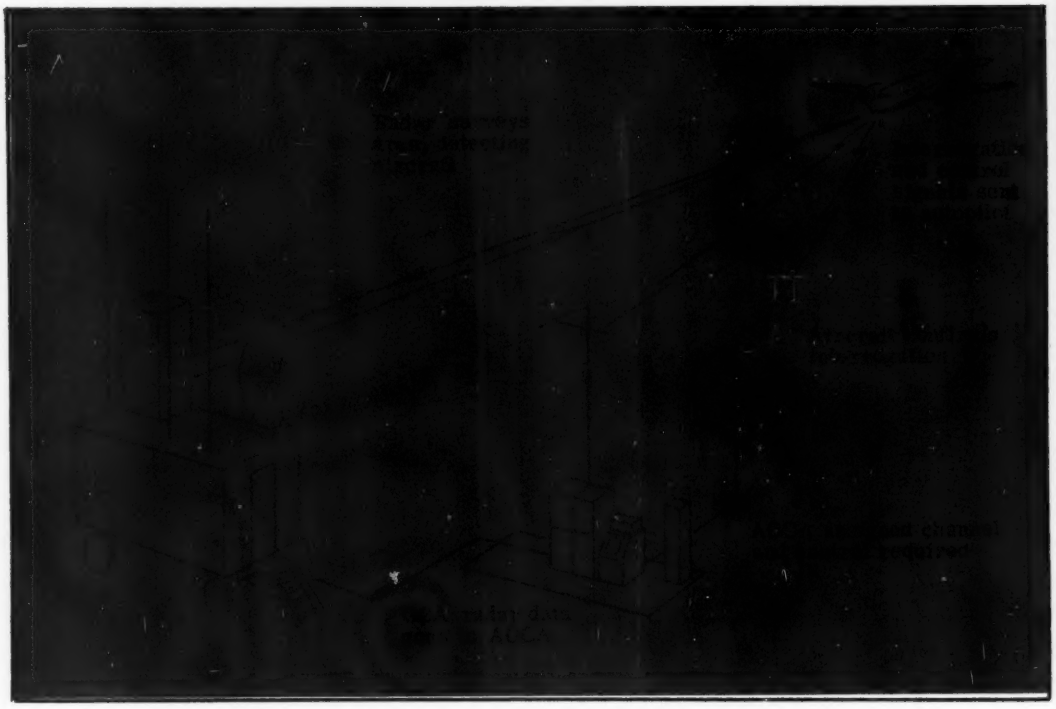
Entering on a base leg, Lieutenant Upshaw crossed the river at the end of the Laoag strip, passed over a high bank and landed on the 5100-foot asphalt runway. The landing was hot—the temperature was 93, and there was no wind. After using up all of the runway, the 500-foot over-run, and running through a bamboo fence, the F-80 came to a stop, undamaged, in a sugar cane field.

To
M/Sgt MIKE MITCHELL
Keesler AFB, Mississippi

A B-25 made a normal takeoff at Keesler Air Force Base and upon becoming airborne, it was noticed that the nose gear position lights, which indicate the wheel's relation to the alignment of the aircraft, showed the gear turned to the right. The position indicator for the nose wheel indicated down but unlocked. Inspection by Sergeant Mitchell, flying as engineer, revealed the nose wheel had retracted against the door and out of alignment.

The gear was lowered and visual inspection revealed no damaged parts, so Sergeant Mitchell requested permission of the pilot to cut a hole in the fuselage of the aircraft for an attempt to straighten the nose wheel manually. Permission was granted and an opening in the fuselage was made by use of the crash ax. Sergeant Mitchell then obtained one of the hand rails from the top of the bomb bay and after approximately one hour's work and cutting one more hole, the nose wheel was straightened. He and the copilot then went to the rear of the airplane to keep weight from the nose wheel and a successful landing was accomplished. Cause of the emergency was found to be malfunctioning of the mechanical wheel aligning system.

AUTOMATIC GCA



By: LEONARD DAVID CALLAHAN, Director of Public Relations, Gilfillan Bros., Inc.

AUTOMATIC Ground Controlled Approach (AGCA) equips the airport skyway with radar rails. An accessory to a standard GCA, it finds an aircraft, electronically locks onto the autopilot, and automatically guides the plane down on an approach to the runway without manual control in the air or on the ground. It will bring in six aircraft simultaneously at one minute intervals with precision, safety and speed.

Landing an aircraft in clear visibility has required skill and timing since Kitty Hawk. As aircraft grew in complexity, weight and speed, the series of coordinated calculations and actions demanded of the pilot have also multiplied. Instrument weather makes the intricate job of landing an aircraft immeasurably tougher. Airborne instruments and electronic ground aids have been developed each year to assist the pilot. But it has become apparent that the myriad instruments and split-second mental calculations involved in an instrument approach with a modern aircraft are taxing the capabilities of the pilot to the limit.

Realization of these human limitations resulted in a contract from AMC, Watson Laboratories to Gilfillan Bros. Inc. of Los Angeles, to develop a GCA unit to bring aircraft down the glidepath automatically.

Three experimental AGCA units have been built and field-tested. The latest AGCA unit was successfully demonstrated at Ontario, California, to top officers from the USAF, the Navy, the RAF, and officials of the CAA, the Research & Development Board, and the Air Navigation Development Board. Authorities who witnessed the demonstrations agreed that AGCA will allow full-scale utilization of airbase facilities in high density, all-weather traffic conditions. Existing USAF requirements specify automatic control down to 50 feet above touchdown. However, research is being conducted to accomplish full landings and bring the aircraft to a complete automatic stop.

AGCA has been called a multi-brained radar robot, combining in a single, simplified fail-safe system all of the features of the three landing sys-

tems: (1) automatically lands aircraft equipped with autopilot, (2) provides talk-down landing for aircraft without autopilot or with malfunctioning airborne equipment, (3) also activates the ILS cross-pointer meter for manual control, if desired.

AGCA functions in the same manner as the final approach precision system of GCA. In the standard GCA a *human operator* advises the *pilot* how to reach the ideal glidepath and approach course. In AGCA, *electronic tracking circuits* observe the location of the aircraft and transmit to the autopilot impulses which activate the *autopilot* servos and bring the aircraft down the ideal approach.

AGCA, in addition to the basic GCA unit, consists of one rack of central equipment, one monitor scope, plus a small control and communications panel. Six tracking units occupy three additional racks and these units control six aircraft simultaneously on final approach. The total requirement in the aircraft is a regular VHF (or UHF) communication set, plus a standard electrical input autopilot with a seven-pound decoder unit.

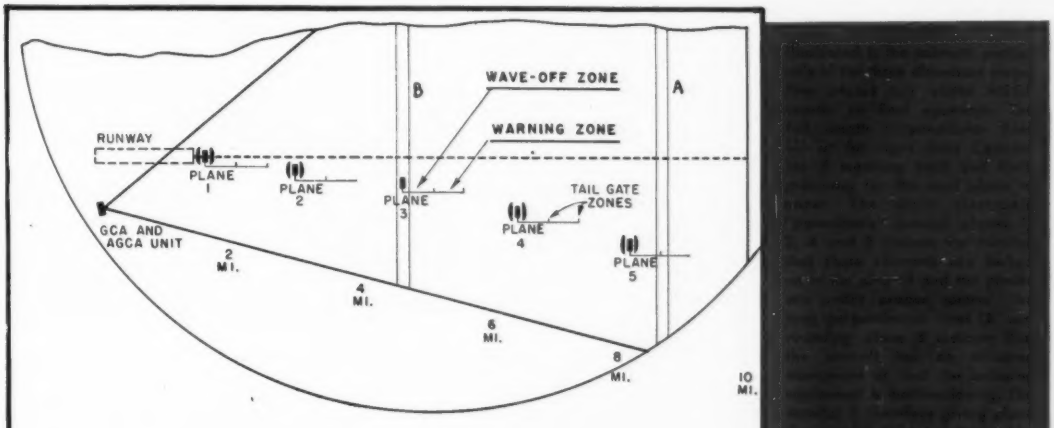
The use of one radio frequency channel to control six aircraft plus voice communication and cross-pointer meter data is a decided saving over other existing landing systems. Utilization of the subcarriers on the single frequency provides up-down and right-left control for six aircraft, plus a spare subcarrier to provide throttle and braking control for all aircraft. In addition to the voice communication on this same frequency, there is sufficient room in the remaining portion of the channel for omni-range information. These telemetering circuits have been proved in field tests.

How Does AGCA Work?

Plugged in to a regular GCA unit, the AGCA tracking Channel No. 1 (see diagram) scans back and forth over a rectangular block of space on the final approach course eight to ten miles long and one mile wide. When an aircraft appears in this zone, Channel No. 1 locks on to it and Channel No. 2 starts scanning the same area. Channel No. 2 does not "see" the first plane as Channel No. 1, by locking on, has caused the plane to be "invisible" to all other tracking channels. Similarly, Channel No. 3 will not see planes numbers 1 or 2, etc. As each aircraft appears in the zone, the six tracking channels successively take over their respective plane. Control signals to the autopilot are transmitted on a VHF channel. The aircraft automatically confirms the information to the ground by radio.

Behind each aircraft, AGCA provides a protective electronic "tail gate" two miles long. If plane No. 2 should start overtaking plane No. 1, it would enter the "yellow zone" of plane No. 1's gate. Immediately, a bell and a yellow light in the plane and on the ground warns the pilot and the monitor of the overtake. If plane No. 2 can now slow down sufficiently, nothing further occurs. But if plane No. 2 continues the overtake into the red zone of the protective gate, a red light and warning bell are activated, both on the ground and in the air, and plane No. 2 is automatically sent around.

If, during an automatic approach, an aircraft should fail to keep within limits permitting the plane to land safely, the tracking unit will also detect this situation and give the aircraft an automatic go-



AN AGCA OPERATION AS DISPLAYED IN THE AZIMUTH PORTION OF THE AZEL MONITOR SCOPE

around. Similarly, when an aircraft enters the zone initially and the tracking unit detects that the plane is not responding to the automatic control (airborne equipment out of order or not equipped with autopilot, etc.), the ground monitor is notified by warning light and bell. Identification of the aircraft failing to respond is also shown and the monitor can instantly communicate with that particular aircraft by semi-private line communication and give the aircraft a regular GCA talkdown, or a go-around.

How Does The Pilot Make An AGC Approach?

In the ultimate air navigation systems, the aircraft will be given its clearance onto AGCA automatically. Under existing navigation systems, the pilot, on reaching the AGCA zone, requests landing clearance from the control tower and receives the reply, "Actuate AGCA." The pilot need only push a button on his instrument panel. AGCA then automatically finds the particular subcarrier of the radio channel to be assigned to that aircraft.

The pilot can constantly check his approach by observing his crosspointer meter being simultaneously activated by AGCA. On reaching the two-mile, one-mile and half-mile points from touchdown, a continuous voice recording automatically opens the semi-private line communication to that particular aircraft and notifies the pilot "two miles from touchdown," "one mile from touchdown," etc.

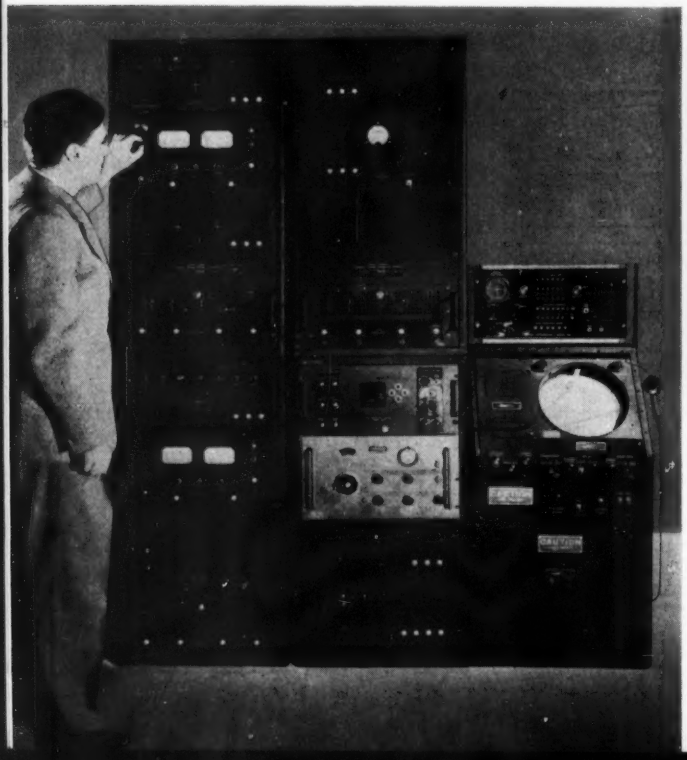
Additional Safety Features

"Rate" circuits provide a smooth turn on to the approach course and prevent overshooting. They also furnish a "zero reader" type indication to the crosspointer meter in the aircraft. The instrument zeros when the aircraft is put into a bank and turn that will make good the desired approach.

A safety feature of AGCA is that its control signals to any aircraft on approach are independent of effects of another aircraft. No beam bending effects can occur. An operational advantage is that parallel runways can be served simultaneously by a single unit.

Automatic GCA even checks itself constantly to make sure it is functioning properly. It cannot do anything to cause an unsafe condition. With virtually all of the AGCA system on the ground, it is easy to maintain and prevent breakdowns or equipment failure. Complete duplicate equipment may be provided on the ground in a stand-by condition, ready instantly to replace the inoperative unit. Even total failure of the automatic equipment does not present an unsafe situation as the basic GCA talkdown is always available.

Over 500 AGCA approaches have been made at Ontario, California, by flight test personnel, establishing the ability of electronic equipment to accomplish smoother and more accurate approaches than is possible by manual control during IFR conditions.



Above—Monitor sees all aircraft in three dimensional Azel scope. In the center of this panel rows of lights show status of all six aircraft. Left—Complete AGCA unit which plugs in to standard GCA system. Middle rack is common to as many as six control channels. Left rack includes control channel No. 1 and No. 2. For six aircraft, two additional racks containing similar control channels would be used. Here monitor can check progressive distance from touchdown, airspeed, crosspointer data and rate error.

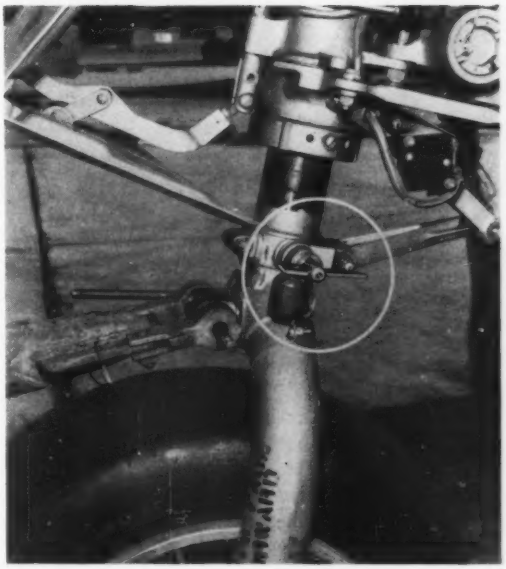
WHO TOWED THAT F-86?

IF maintenance officers ask the above question whenever an F-86 nose gear collapses, they may learn who is responsible for many costly accidents to F-86 planes. Investigation of numerous F-86 accidents, in which the nose gear had collapsed, indicated that in the majority of cases failure of the nose gear had been caused by maintenance personnel towing the aircraft without first installing the required towing wedge.

When towing an F-86 without the towing wedge installed, the nose gear rotating mechanism remains directly connected to the nose gear strut and since the steering mechanism is designed for turns of 15 degrees maximum during towing, any turn in excess of 15 degrees will result in damage to, or failure of, some part of the nose gear rotating mechanism.

When an aircraft having a damaged rotating mechanism is flown, the pilot may not have any indication of trouble or impending disaster until time of touchdown of the nose gear during landing roll. This is because the nose wheel tends to remain in proper alignment with the aircraft during takeoff, then when the gear is retracted the nose gear turns 90 degrees to assume its normal retracted position. Upon extension of the gear, the rotating mechanism being inoperative, the wheel remains perpendicular to the longitudinal axis of the airplane. The nosewheel contacting the runway in this attitude will result in the gear folding.

It is believed that accidents of this nature can be reduced by acquainting all maintenance personnel with the danger that may result from negligence in performing such a routine task as towing an F-86. As an additional reminder, the nose gear ground lock and the towing wedge may be tied together with a red streamer and the nose gear door stenciled to warn personnel to install the wedge before towing the aircraft. Proper procedures have been brought to the attention of maintenance personnel through the medium of the U.R. Digest, T.O. No. 00-10-1, Item 54, F-86 Section—Page 20, and T.O. No. 01-60JLA-2. Let's follow them and eliminate these accidents.



With the wedge installed correctly, the F-86 is ready to be towed.

Landing lights trace the angle of a helicopter descent and takeoff from the roof of the Los Angeles Post Office.

CAN 'COPTERS FLY ON INSTRUMENTS?

"YES," says one of the nation's top helicopter pilots, "the helicopter can be flown on instruments and to do so is only a little more tiring to the pilot than instrument flight in a fixed-wing airplane."

This statement comes from the chief pilot of Los Angeles Airways, Captain Charles B. Kesselring, an ex-Air Force helicopter instructor who has logged some 2600 hours of whirli-bird flying time, and who has persisted in his efforts to fly the 'copter on instruments, despite the fact that many aviation authorities have steadfastly maintained that flying helicopters by instruments was not only impractical but impossible.

Proof positive that Kesselring's pioneering work has paid off is the recent and first CAA instrument approval for helicopter flights. Although this CAA approval is limited to takeoffs under a 200-foot ceiling and through an overcast, with only the helicopter being certificated, Kesselring is confident that it is only a matter of time until full CAA approval will be forthcoming and 'copter pilots will be given instrument ratings. For more than a year he has supervised and made flight tests on instrument flying, and pilots of the company have made repeated landings and takeoffs under simulated zero-zero weather conditions.

And, take it from Kesselring, it hasn't been easy; nor have all the problems involving instrument technique been solved. It all began when LAA was organized in 1944 and applied to CAB for a mail certificate which was granted in May, 1947, for a three-year period. Service started in October, 1947. Operating four routes divided into four segments, LAA is utilizing five company-modified Sikorsky S-51's to cover approximately 1500 miles a day to pick up air mail from suburbs within a 50-mile radius of the Los Angeles airport. Company pilots log some 500 hours flying time and approximately 4000 landings in a month in flying the basic route of 310 miles three times a day. This includes 17 to 19 daily trips to downtown Los Angeles, where landings are made atop the Post Office. During the winter months, two-thirds of the flying time is accomplished at night and includes more than 10 nightly landings on the Post Office roof.

From the first day of operations the need was apparent for approved IFR flight [illegible] company was to maintain and meet split-second schedules. Kesselring tackled the problem of instrument technique and last June began helicopter hood work. Patiently, through trial and error methods, he completed in January a rearrangement of the Sikor-

sky instrument panel to provide for the regrouping of standard instruments and the addition of others.

Additional instruments included by Kesselring were the attitude gyro compass, the J-3 attitude indicator and the turn-and-bank indicator, in that order, in the center of the panel. On the extreme right of the panel, Kesselring installed an ID-48 localizer glide path needle. He reversed the standard Sikorsky grouping, which includes airspeed, rpm, manifold pressure and fuel and oil gauge, to the left side of the panel in order for the pilot to watch these instruments more easily when he operates the "pitch" stick. Two of the airline's helicopters have been modified in this manner with the other three planes scheduled to undergo this modification by midsummer.

One of the biggest problems he encountered was shock mounting with instruments, but with the addition of sponge rubber, vibration, he said, was kept to a minimum.

Using the new panel, simulated instrument flights were started, with Kesselring's first major concern to develop an instrument procedure and technique consistent with safety. Aware of the many and differing attempts to solve the various problems in helicopter instrument flying, Kesselring, after experimentation, decided the answer lay in additional instrument training for the pilot. With this approach in mind he launched an overall training program of flying simulated instruments.

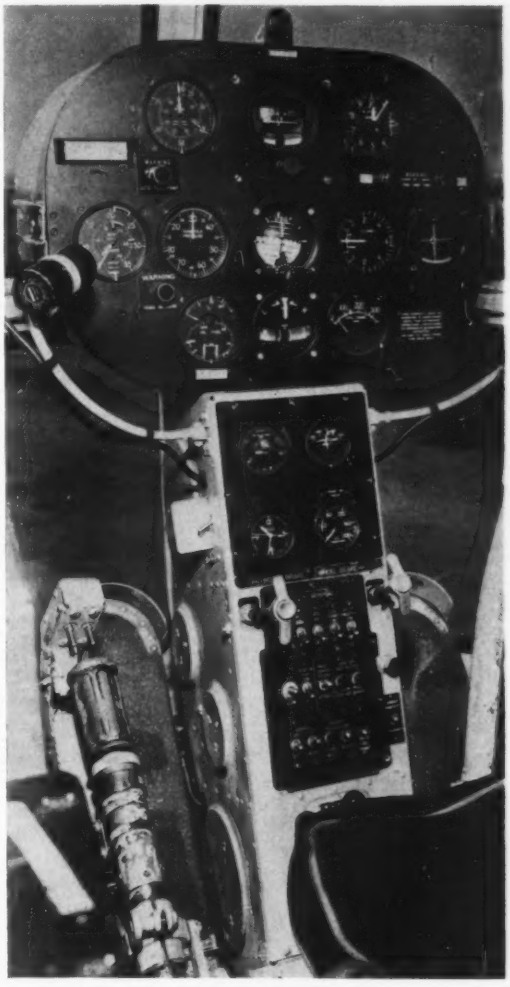
Kesselring's conviction that the answer lay in additional training was borne out as pilot proficiency increased in ratio to pilot training. New pilots, he found, were quicker and more readily adaptable to the necessary technique for flying instruments than older pilots, who had been told for years that helicopter instrument flying was exceedingly difficult, if not impossible. A similar psychological factor that had to be overcome with training, was night flying checkouts.

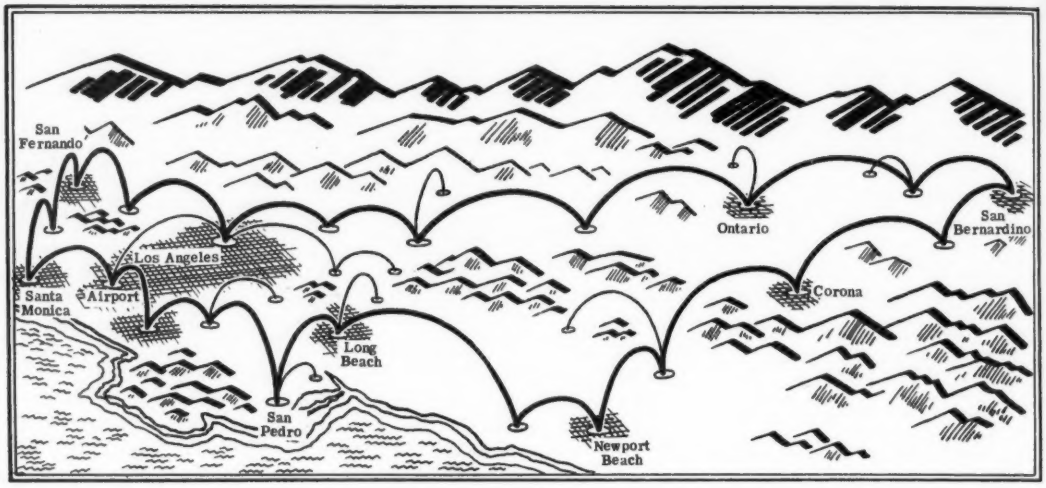
"We approached the idea of instrument flying in helicopters from a slightly different angle," Kesselring said. "Instead of giving several of our pilots a relatively short period of flying on instruments, as has been done by others, and trying to draw any conclusions from their ideas, we have taken just three pilots and tried to build up their instrument time and then draw our conclusions from what they have observed."

"As a result of their flying," he continued, "we feel that helicopter instrument flying should definitely be kept to just one group as in fixed-wing instrument flying. The pilots experienced some difficulties in slow speed instrument flying, but as their

Mr. Clarence Belinn, LAA President, checks with Chief Pilot Kesselring.

For instrument flights, Kesselring modified the standard Sikorsky panel.





CAA approval permits LAA pilots flying the basic route to "go on instruments" for 15-minute periods when schedules are threatened by smog.

instrument time built up the problem of flying at slow speeds was eliminated.

"We are now able to fly the 'copter at speeds between five and 15 mph for indefinite periods of time and are able to hold a constant heading and altitude. While it is of questionable value," he added, "we have been able to hold a definite heading and track using low speeds with the aid of radio beams, ILS glide path and localizers."

When using ILS or GCA, Kesselring found that for short periods of time the pilot was able to take advantage of the slow speeds on the final part of approaches. Following flight tests they found the best angle of descent for the helicopter was four or five times the angle of fixed wing aircraft, or around 13 degrees, at an IAS of 50 mph.

Answering a question on instability, Kesselring said the helicopter is no less stable on instruments than it is in flying contact. "Our pilots have become used to this instability," he explained, "and have learned to react in accordance with this particular fault of the 'copter. We have kept pilots under the hood for periods of two and one-half hours with no ill effects or serious fatigue.

"Considering the short period of time we have been flying instruments, it is not impossible to believe that the 'copter could be flown on instruments for periods as long as four hours. Perhaps it will be possible, in the future, to build in stability, or use some new type automatic pilot that would largely eliminate this problem."

For the future, Kesselring visualizes multi-engine installations placing the helicopter on an all-weather basis and at the same time largely eliminate the problems of instrument flight. More sensitive instruments and better radio navigational aids are also needed, he said.

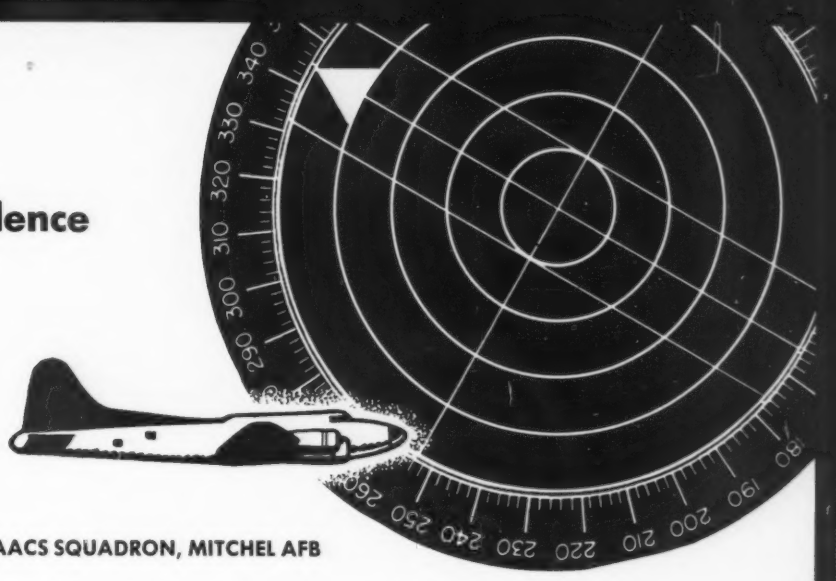
With the helicopter usually being called to duty in emergency rescue work under the most severe flight conditions, Kesselring emphasized the importance of continued research for full instrument operation, night flying, and operations under extreme turbulence.

"We do not know all the answers on instrument flying in helicopters. Through our approach to the problem, we have cracked the fundamentals and it will now be possible to accelerate our research toward achieving the ultimate; which is all-weather helicopter flying. This development will be gradual to conform with the flight safety policy of the company," he said.

The continued development and attainment of absolute instrument flight by LAA, he added, will be coordinated with a federal program for the installation of counterpart ground aids, which eventually will comprise a continuous airways system adaptable to national defense as well as private enterprise.

According to Kesselring, who is keeping an optimistic eye on the future, the helicopters have been blamed for too many problems that would be eliminated with additional pilot experience. Their opinions on helicopter instrument flying have not become fixed, nor have they yet drawn any final conclusions, except that it is simpler than anticipated—and it can be done. (U)

he had confidence



By SGT. JOHN MARRA, 1916th AACS SQUADRON, MITCHEL AFB

ALL too frequently pilots who have used VHF/DF in an emergency, seem embarrassed about the whole thing. Perhaps this is a reason some pilots, when lost, fly around wasting fuel and time instead of calling the nearest VHF/DF station.

AACS equipment on the ground should be considered part of the airplane's equipment—facilities in which millions of dollars have been invested to assure safe flight.

Pilot confidence in AACS facilities was displayed recently by a B-17 pilot on a flight from Rome AFB, New York, to Mitchel AFB.

Flying in a storm, the B-17's radios became inoperative. Weak connections in the antennas were strained by severe turbulence causing them to break. With no voice communication on VHF and with the low frequency range receiver also out, the pilot continued toward his destination, flying his IFR flight plan as originally filed. Meanwhile, the weather at Mitchel dropped far below minimums in rain and fog, with gusty winds up to 55 mph. When the pilot's position report became overdue, the Direction Finder station at Mitchel was notified.

The crew of the B-17 kept working with the radios. A half-hour after DF was alerted, radio contact on Channel D was made. Seven other channels on the B-17 remained inoperative due to bad relays. The contact made on Channel D was weak and broken by static as turbulence jarred the patched-up antenna connection. Despite poor connections, the pilot was given steers which in a few minutes brought him over Mitchel. Each steer was repeated several times before it was received.

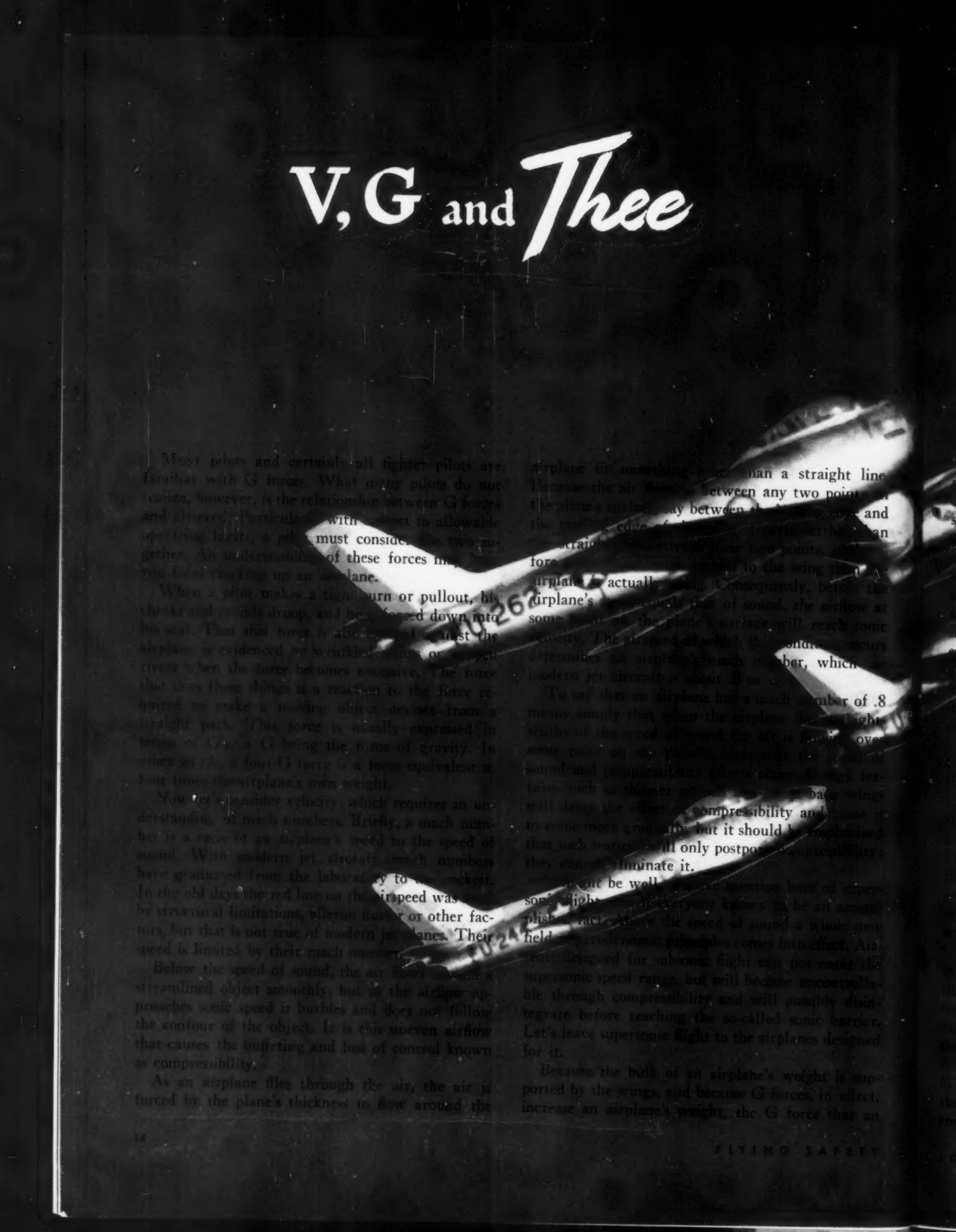
Over the field, GCA operators proceeded to relay instructions guiding the B-17 around the pattern for a GC approach.

Two GCA attempts were foiled by very strong crosswinds. On the second attempt, the B-17 appeared to be perfectly lined up when it broke through the low overcast, but the pilot was instructed to pull up. Reason: the drift was too great. Although the plane was only a few feet from touchdown, there was the possibility that it may not land squarely on the runway. Like the DF operator, GCA operators had to repeat some of the instructions several times before they were received clearly.

After the second attempt, the pilot was advised to fly to Otis AFB, Massachusetts. GCA and DF, working together, guided the B-17 back up to 7,500 feet, where the pilot started out for Otis—still relying solely on Channel D. As the B-17 flew away from Mitchel, DF operators continued relaying steers until the plane was about halfway to Otis. At that point, Otis DF, which was notified through Flight Service, picked up the B-17 and continued relaying bearings until the plane was safely over the field from where it was turned over to GCA for a safe landing.

This flight was spared from possible disaster first, by the pilot's contacting DF at the earliest possible moment rather than by flying around consuming precious fuel and perhaps flying away from Mitchel AFB; second, by his heeding all GCA instruction even though he appeared to be well lined up with the runways on his second attempt; third, by his remaining strictly on courses relayed by DF operators instead of trying to fly to Otis on his own. Last and probably most important, was the fact that the pilot had complete confidence in the navigational facilities and the men who operated them.

V, G and *Thee*



Most pilots and certainly all fighter pilots are familiar with G forces. What many pilots do not realize, however, is the relationship between G forces and airspeed. Particularly with respect to allowable operating limits, a pilot must consider the two together. An understanding of these forces is important in maneuvering up an airplane.

When a pilot makes a tight turn or pullout, his cheeks and eyelids droop, and he is forced down into his seat. That this force is also present throughout the airplane is evidenced by wrinkled wings on some jet fighters when the force becomes excessive. The force that does these things is a reaction to the force required to make a moving object deviate from a straight path. This force is usually expressed in terms of Gs, a G being the force of gravity. In other words, a four G force is a force equivalent to four times the airplane's own weight.

Now let's consider velocity, which requires an understanding of mach numbers. Briefly, a mach number is a ratio of an airplane's speed to the speed of sound. With modern jet aircraft, mach numbers have graduated from the laboratory to the cockpit. In the old days the red line on the airspeed was limited by structural limitations, aileron flutter or other factors, but that is not true of modern jet airplanes. Their speed is limited by their mach number.

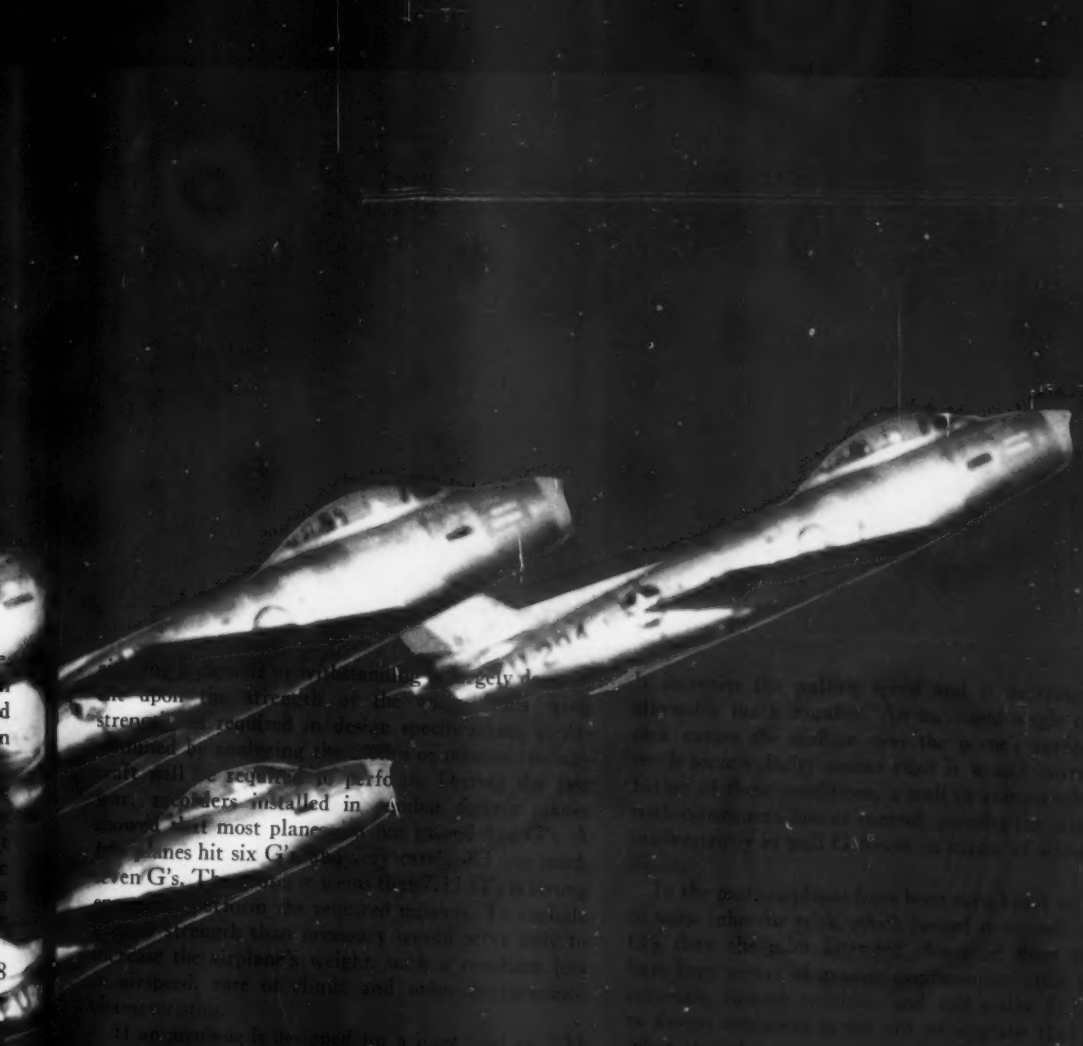
Below the speed of sound, the air flows around a streamlined object smoothly, but as the airflow approaches sonic speed it burbles and does not follow the contour of the object. It is this uneven airflow that causes the buffeting and loss of control known as compressibility.

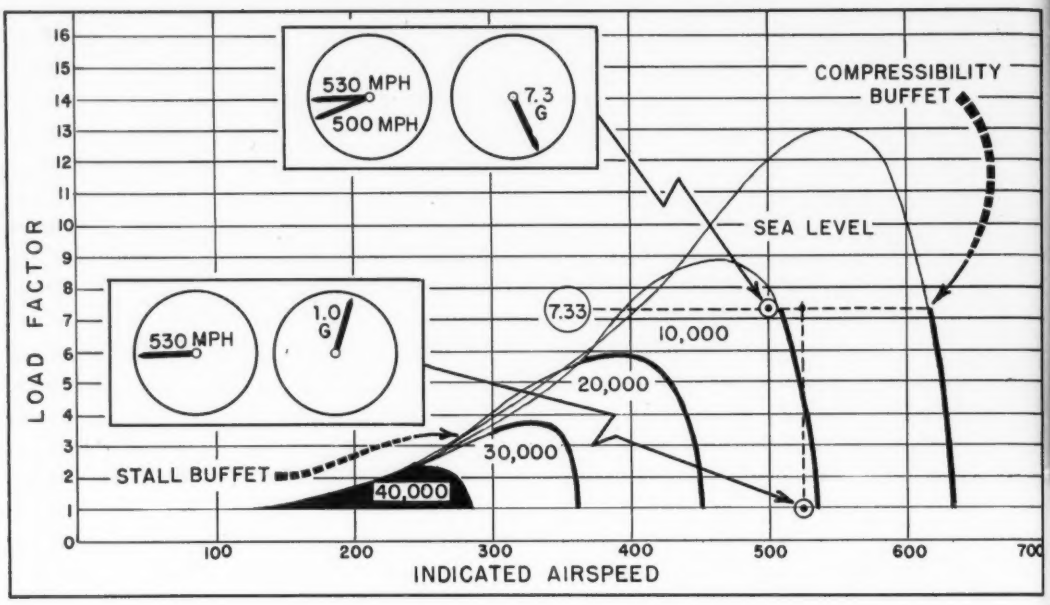
As an airplane flies through the air, the air is forced by the plane's thickness to flow around the airplane in something other than a straight line. Because the air flows between any two points on the plane's surface, the distance between the leading edge and the trailing edge of the wing is greater than the straight line distance between those two points, and the air flowing over the wing must travel faster than the airplane actually is moving. Consequently, before the airplane's speed reaches the speed of sound, the airflow at some point on the plane's surface will reach sonic velocity. The airspeed at which this occurs determines an airplane's mach number, which on modern jet aircraft is about .8 or [illegible].

To say that an airplane has a mach number of .8 means simply that when the airplane is flying at eight tenths of the speed of sound, the air is flowing over some point on the plane's surface at the speed of sound and compressibility effects occur. Such features such as thinner wings and sweptback wings will delay the effects of compressibility and allow the plane to come more [illegible] but it should be emphasized that such features will only postpone compressibility; they cannot eliminate it.

[illegible] can be well [illegible] question here of supersonic flight [illegible] everyone knows to be an accomplished fact. Above the speed of sound a whole new field of aerodynamic principles comes into effect. Airplanes designed for subsonic flight can not enter the supersonic speed range, but will become uncontrollable through compressibility and will possibly disintegrate before reaching the so-called sonic barrier. Let's leave supersonic flight to the airplanes designed for it.

Because the bulk of an airplane's weight is supported by the wings, and because G forces, in effect, increase an airplane's weight, the G force that an





area divided by gross weight) and the intended airspeeds are established, the VG Diagram is plotted. The VG Diagram shown here is for an F-84. The diagrams for other planes are similar.

Notice on the diagram the effect of G forces in causing the stalling speed to increase and the mach limit to decrease. If you are sitting on the red line at any altitude and pull G's, you will hit compressibility. In order to pull 7 G's safely at 10,000 feet you must start about 30 mph below the mach limit. Your mach needle won't tell you this because it is set for one G, or straight and level.

Now consider the effect of altitude on the VG Diagram. Notice that at 30,000 feet you can pull only about four G's without getting a stall buffet or compressibility buffet. The pitch-up at this altitude is not severe, and you have enough allowable G's left to handle it. Down at the lower altitudes, however, the story is different. Here you can pull enough G's to damage the airplane without stalling or hitting compressibility. Also, suppose you are flying at sea level at an airspeed near the mach number, make a six or seven G turn and hit compressibility. The violent pitch-up which occurs will probably increase the load factor beyond the point at which the manufacturer guarantees his product to stay together.

That brings up the subject of rat races. If a pilot is concentrating on the plane ahead and the rat race is getting rugged, better watch that mach meter and don't get caught in an attitude and altitude where you have to pull G's when up at the red line. This boils down to a steep nose-down attitude below 10,000 feet. A pilot in this position has a problem. His airspeed is at the mach limit, he's headed for the ground and his speed is picking up fast. What should he do? Best advice is (1) forget about the rat race and concentrate on your own problem; (a) chop the power; (3) get both hands on the stick so as to be ready to push hard when the compressibility pitch up comes, (4) pull up gradually, taking all the room left between you and the ground. Remember, that below 15,000 feet, for every speed and attitude approaching red line condition, there is an altitude below which you will not have room enough to round out your flight path without pulling excessive G's.

When some part of the plane has air around it moving at the speed of sound, violent trim changes occur and nothing the pilot can do will overcome it. Trim tabs are ineffective in compressibility, so don't use them. If trim is used, and the pilot succeeds in slowing the plane down he is caught with an aircraft very much out of trim when the compressibility effect disappears.

It is fortunate that most planes behave well slightly above the red line at high altitude and the pilot gets warnings such as aileron buzz and buffeting, enough to satisfy him and he slows down, but at low altitude compressibility effects are sudden and violent. Remember not to get caught with your nose down when at the red line at low altitude.

GEAR TROUBLES — B-25

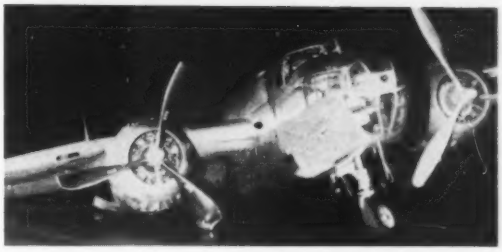
THE retractable landing gear was the talk of aviation when it was first introduced as a method of increasing speed by decreasing drag. This device has been universal in the Air Force for a number of years—only a very few USAF pilots fly planes with fixed landing gears these days. So the procedure for gear-up and gear-down could be assumed to be as much a part of flying an airplane as advancing the throttle for takeoff. But, apparently, it isn't.

The greatest trouble with the airplane landing gear has its source in the cockpit. This is evidenced by a study of 21 major accidents during the first quarter in 1950, involving landing gear troubles in the B-25, a plane with which most USAF pilots are familiar. Among the accidents listing pilot error, confusion of gear and flap handles, premature retraction of gear on takeoff, failure to check gear-down and locked, and failure to use the emergency system, account for the majority.

In the development of the B-25 gear control lever, great thought was given to safety devices which would prevent the retraction of wheels while the plane was on the ground. First, a latch was incorporated which would prevent the movement of the lever without first actuating the latch. Next, as a further preventive of thoughtless retraction, a wire catch was installed to hook over the gear handle which also kept the lever from being moved until the wire catch was first disengaged. As it now stands, there are three distinct movements to retract the gear:

1. Release the wire safety catch
2. Lift the latch
3. Raise the gear lever.

Yet some pilots have raised the gear accidentally, or



have mistaken it for the flaps.

Lights, indicators, horns, gages and tower warnings have been ignored by still other pilots who were first jolted into action when they heard loud scraping noises as steel and aluminum met concrete in wheels-up landings.

Speaking of warning devices, when your selsyn indicator says the wheels aren't all there, or the green lights shine for all but one, don't come in for a landing with your fingers crossed. Go around and take time out to find out what gives in the Down and Locked Department. If normal operation of the gear does not put everything in the green, use the auxiliary and emergency systems until you are *positive* that the gear is down *and* locked. By using the emergency system for lowering the gear when you do not have correct down and locked indications, you have made a positive check. Then if the indicators have faulty readings, be sure to write them up in the form 1A so they will be corrected before the next flight.

Cross Feed

FLYING SAFETY IDEA EXCHANGE

Thorough Inspections — During the takeoff run, a B-26 developed vibration of high intensity, severe enough to shake the circuit breaker panel loose from its mounts. Power was cut and the takeoff aborted. It was discovered that the nose wheel rotating mechanism arm, part 5129977, had about one inch of the outboard end broken off, and the bearing in the lower end of the link assembly of the mechanism, part 2129260, was frozen. It was also found that the snubber assembly, part 5122388, had less than one-fourth inch of fluid in the reservoir—yet there was no evidence of recent leakage.

The B-26 was a transient and the AF Form 41B was not available to check to determine if any hard landings had been made or what maintenance had been accomplished to this system by personnel at the plane's home station. A check of the form 1A revealed only 15 flying hours since the last 100-hour inspection was performed.

Maintenance personnel assumed that the nose wheel snubber, being low on fluid, did not effectively dampen nose shimmy, and the vibration thus set up broke the nose wheel rotating arm, which was probably already partially cracked due to stresses set up by the frozen bearing in the link assembly. The bearing in the link bore no evidence of lubrication as required in T.O. 01-40 AJ-2, and this was undoubtedly the cause for the frozen bearing. Poor maintenance as evidenced by the nearly empty reservoir in the snubber and the lack of lubrication in the link bearing almost caused a serious accident. This incident emphasizes that personnel maintaining aircraft should be thorough in the accomplishment of periodic inspections.

R. Ferguson, WOJG, USAF
Biggs AFB, Texas

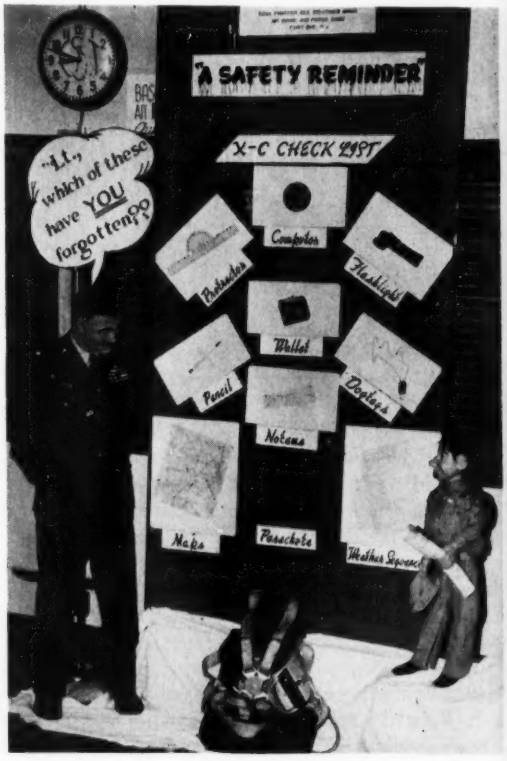
Flying Safety Programs — Each pilot in the Idaho Air National Guard gets into the Flying Safety act. And if his contribution is good, it pays off in a prize.

A schedule is posted by Capt. Clarence E. Hall, Flying Safety Officer, assigning each officer a date to give a 15-minute talk or presentation on any phase of flying safety. In the event the pilot is unable to attend the drill on the date designated opposite his name, it is his responsibility to obtain his own substitute.

A prize is awarded periodically for the best talk or program. (U)

Maj. Robert J. Fitzsimmons
Senior Instructor, Idaho ANG

Safety Reminders — Flying Safety displays at McGuire AFB, Fort Dix, New Jersey, assist the aircraft accident prevention program initiated by the 52nd Fighter All Weather Wing. The displays created by T/Sgt William C. Percy have appeared at various locations around the base, including Operations, Officers' Mess, and the Service Club. 1st Lt. Gabriel A. Hartl is 52nd Wing Flying Safety Officer. (U)



Cockpit Data Holder—More and more organizations in the USAF are being equipped with the North American F-86; therefore, the 1st Fighter-Interceptor Group is passing along ideas for making the F-86 cockpit more convenient by overcoming the inadequate space or provision for pertinent data such as Radio Facility Charts, etc. The group has also considered the problem of the positions of the circuit breaker panels. It is almost an impossibility to read them when strapped in.

For flying safety reasons it would be very desirous also to have complete cruise control data immediately and conveniently available to the pilot. This would be well worth the trouble placing it in the cockpit if it prevented only one pilot from bellying in or bailing out short of a destination.

We have here in the 1st Fighter-Interceptor Group what we believe is an invaluable assist in all three of the problems stated above. It is the "Cockpit Data Holder."

Captain Paul C. Harrold of the 1st Fighter-Interceptor Group Standardization Board arranged the cruise control data, circuit breaker panels, and position report, change of flight plan and weather report so that it could be reproduced on 5¾" x 3½" cards. One side of the cruise control card is for a clean airplane and the other for a plane with external tanks. This cruise information has been thoroughly tested by the group and found to be accurate.

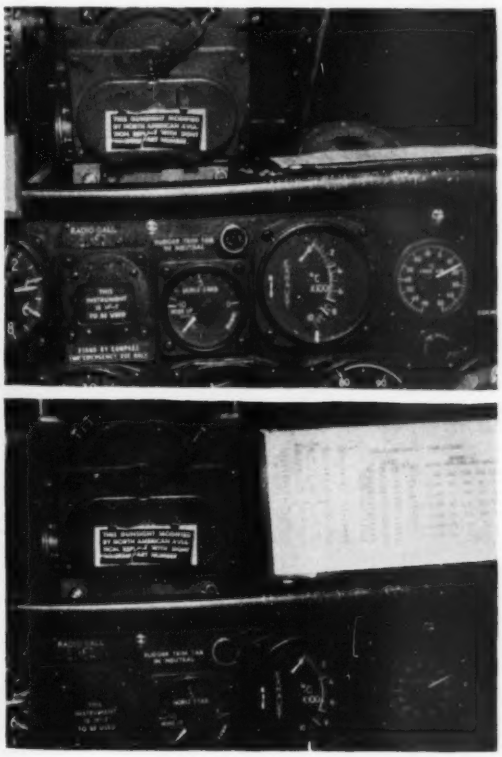
In order to have this invaluable information always conveniently available, a cockpit data holder was designed, and it has proved very satisfactory in tests.

When installed, the device in no way bothers the pilot or interferes with normal operation of the aircraft. It is spring loaded so as to flip back out of the way when not being read. If electrical troubles develop, flip up the circuit breaker panel diagram and no gymnastics will be required by the pilot to know which circuit breakers are popping. Cruise "poop" is always handy and there is no excuse for a "loused-up" position report or weather report.

We think it's a good little gadget, and if any other outfits are interested, we will be pleased to send them a copy of the drawings made by Lt. John Marvin of the 27th Squadron.

1st Lt. Felix Asla, Jr., Flying Safety Officer
27th Fighter-Interceptor Squadron, March AFB

Cockpit data holder is shown folded and in reading position.



CAA Movies — Approximately 300 motion picture films and 150 filmstrips are listed in the latest Civil Aeronautics Administration catalogue of visual education aids available for loan to educational institutions, aviation and civic groups, and other interested organizations.

The new catalogue, just off the press, supersedes the one published in April last year and subsequent supplements. It may be obtained by writing CAA's Office of Aviation Information in Washington or at any CAA Regional Office.

Last year, films and filmstrips distributed by CAA received 41,000 showings, and were seen by an audience of a million and a half, almost 70 per cent of them in educational institutions.

Some of the films, which deal with subjects of importance to the study of aviation and its related fields, have been prepared by the CAA, by the Air Force and Navy Departments, and others by the aviation industry—manufacturers, state groups, individual air lines, etc.

They are used in CAA's training programs for its own personnel, and also are available on a loan basis, to secondary schools, colleges, universities, commercial airlines and others interested in the study of aviation. Films may be borrowed for periods not to exceed two weeks. The catalogue lists film centers located in major cities in this country and in Anchorage, Alaska, and Honolulu, T. H. (U)

Anchoring the Navigator—M/Sgt. Jerrald L. Hastings, Radar Operator with the 375th Weather Reconnaissance Squadron (VLR), Eielson AFB, Alaska, recently perfected an answer to the ever-recurring problem of both comfortably and safely anchoring the navigator in a B-29—a new harness lighter in weight by two and one-half pounds, adjustable to any size, which can be worn under a parachute.

Navigators of the 375th Weather Recon Squadron, whose missions include the grueling seventeen-hour, non-stop Ptarmigan flights over the North Pole and return, had complained for some time that being tied in the harness which bolts them to the floor, restricted their movement about the cockpit, hampered them while using the astrodome, and, in general, created a drag on their stamina, causing fatigue.

On the Ptarmigan run, the navigator, above all else, experienced though he may be, must be constantly on the alert. Here, the compass is unpredictable. The sun plays queer tricks and the only check points are the ceaselessly shifting cracks in the ice.

The harness was a necessary evil, for in the past navigators have been lost from the astrodome in pressurized aircraft while shooting celestial fixes. However, with the old type harness, which fastened in two places, no parachute could be worn. Parachutes are much in favor with members of the "Pole Vaulters" of the 375th.

Specifications on the new harness developed by Sergeant Hastings have been submitted to Headquarters AMC for consideration. In the meantime, all B-29's of the 375th have been equipped with the new harness which is considered a distinct improvement for morale, comfort and flying safety. (U)

Public Information Officer,
375th Weather Recon Sqdn, Eielson AFB, Alaska

New Grid Protects Turbojet Engines—Designed by engineers of the University of Kentucky Aeronautical Research Laboratory, a metal screen grid has been developed which will prevent a .50 calibre shell case from entering the axial-flow turbojet engine at airspeeds of over 600 mph. Grids now in use are unable to withstand the impact of particles entering the airstream at more than 275 mph. In use on fighter aircraft powered by engines such as the J-35 and the J-47, the new screen grid can be retracted after takeoff in order to gain greater cruising range. In firing gunnery missions or in combat use the grid would be lowered into position for engine protection. Retraction of the grid during flight will also prevent icing. (U)

BUDGET FLYING

By COL. JOHN M. SCHWEIZER, JR.

In spite of the fact that the Defense Budget accounts for no less than 73 per cent of the total expenditures of the United States government—it isn't enough to cover carelessness and wastefulness. Economy is the watchword and rightfully so. The taxpayers expect, and are entitled to, one hundred pennies for every dollar invested in defense. Waste cannot be tolerated.

We must be cost-conscious. A limited budget means we have got to do more with what we have. We must use care and discretion in the utilization of the equipment that is available to us.

I'd like to buy a new car but my budget is definitely limited. So I'm holding on to the 1947 job. I drive it carefully. I keep the engine nicely tuned. I keep her washed and polished. I need the dough for other things—so I try to keep the "superballoons" going another ten thousand miles by being gentle with the brakes, and taking it easy on the curves. No sudden starts and stops for me. My $50 deductible insurance policy won't take care of a crumpled fender so I drive carefully. By being budget-minded and cost-conscious, I have accomplished two important things:

a. I have saved money.

b. I received a Safe Driving Award for going several years without an accident.

Why won't it work in the Air Force? It will if we get away from the misguided idea that it's not our money we're spending—but Uncle Sam's—and that there's plenty more where it came from. That's wrong. There isn't plenty more where that came from. Lots of times you have seen carelessness and indifference during aircraft refueling result in an overflowed tank. "It's Uncle Sam's hi-octane—a few gallons on the ramp is unimportant," you say. But that fuel on the ground costs the taxpayers money. And gasoline isn't good for rubber hose connections and rubber tires. Hi-octane fuel deteriorates rubber—shortens its life. A rubber hose connection or a tire may fail at a critical time, as a result of having been too frequently drenched with hi-octane fuel.

The pilot who rides the brakes, locks one wheel while turning—shortens his landing roll by excessive use of brakes—shortens the life span of brakes and tires. This is extravagance and often leads to a failure, at a critical time, resulting in a costly accident.

The pilot who is always in a hurry to get where he's going (increased manifold pressure, increased RPM) gets there five minutes early but he has used up a lot of extra fuel in the meantime. Multiply this by the thousands of flights the Air Force makes every day and it has an accumulative effect—it runs into money—big money. Plan the flight with economy in mind—take power settings and fuel consumption seriously. We can give the taxpayer a bit of a dividend at the end of the year by watching such things—and we'll undoubtedly help keep the accident rate down at the same time.

Damaging or wrecking an airplane through carelessness, recklessness or indifference would not be conducive to keeping your job very long in commercial aviation. An airline corporation wouldn't last long if its employees were careless or reckless in their operations. We can't either. Let's make the few dollars we have stretch as far as possible. This will accomplish three things:

a. Save the taxpayer money and pay him a greater dividend on his investment.

b. Give us a more efficient and effective Air Force within our limited budget.

c. Improve our safety record.

Get budget-minded. Consider government property as though it were your own personal investment, which it is. (U)

USAF PILOT'S HANDBOOK

Effective 1 July 1950, the publication AN 08-15[illegible] States Air Force Instrument Letdown Procedures, Continental United States, will be discontinued and Pilot's Handbooks for the area will become effective.

Pilot's Handbooks are to be placed in airplanes for the use of flight crews while airborne and will contain operational flight data pertaining to airport facilities, flight procedures and approach and landing procedures. This data is presented in the form of Instrument Approach and Landing Charts, Area Mileage Charts, Airway Charts and Supplementary Aeronautical Charts. Where both radio range and ADF letdown procedures are approved for use to an airport, only the range procedure is included in the handbook.

AFR 5-34 dated 26 January 1950, establishes the USAF Pilot's Handbooks as the official publication medium for instrument approach and letdown procedures for use by the United States Air Force.

The Aeronautical Chart Service, Air Materiel Command, has been charged with the responsibility for the production, distribution and maintenance of all USAF Pilot's Handbooks.

Procurement and Distribution—USAF activities located within the Continental United States and Air National Guard Units are to submit all requisitions for handbooks or for individual approach and landing charts to the Aeronautical Chart Service Store, 2nd and Arsenal Streets, St. Louis 18, Missouri. USAF requisitions should be submitted in accordance with AFR 67-3, and should cover the consolidated requirements for each Air Force base or other separate organization as specified in AFR 5-34, and Air National Guard in accordance with NGB Air Memo 5-1. Air Force Base Units are responsible for advising the Aeronautical Chart Service Store of changes in addresses or requirements.

USAF activities located outside the Continental United States are to submit requisitions for Pilot's Handbooks through supply channels designated by the Theater Commander.

Naval activities shall forward all requests for Pilot's Handbooks to the USN Hydrographic Office, Department of the Navy, Washington 25, D. C.

Amendments—Periodical amendments, numbered consecutively, will be issued for each Pilot's Handbook and will provide additions, revisions and information necessary to keep the handbook up-to-date.

Any errors noted in airport information or base detail should be reported on the Notice of Unreliability (in the back of each handbook) and sent to the Commanding Officer, Aeronautical Chart Service, Department of the Air Force, Washington 25, D. C., Attention: Aids to Navigation Branch. The Aeronautical Chart Service will acknowledge receipt of all information forwarded. Every pilot or navigator is encouraged to be on the alert for errors in the Charts.

Notices of unreliability should note the source of all changes, i.e., Notam, photography or personal observation, and should be accompanied by available photographs, sketches or corrected charts.

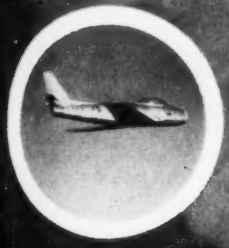
Changes affecting a letdown procedure should be processed in accordance with AF Regulation 55-24 dated 3 April 1950. (*U*)

CITATIONS FOR SAFETY IN FLIGHT

DURING THE QUARTERLY PERIOD, JANUARY, FEBRUARY, MARCH 1950, THE BASES LISTED BELOW ACHIEVED THE LOWEST ACCIDENT RATE OF ANY AIR FORCE INSTALLATION FOR THEIR TYPE OF AIRPLANE AND NUMBER OF HOURS FLOWN. IN BECOMING ELIGIBLE FOR THESE CITATIONS, COMPUTED ON THE BASIS OUTLINED IN AF LETTER 62-3, THE INSTALLATIONS HAVE DEMONSTRATED A COMMENDABLE FLYING SAFETY AND ACCIDENT-PREVENTION RECORD THEREBY CONTRIBUTING DIRECTLY TO THE OVER-ALL PEACETIME MISSION OF THE UNITED STATES AIR FORCE. ALL COMMANDERS, PILOTS AND AIRMEN OF THESE BASES ARE TO BE CONGRATULATED ON THEIR EXCELLENT FLYING SAFETY PROGRAM WHICH REFLECTS CREDIT UPON THE AIR FORCE AS A WHOLE.

BOMBER

B-17 • BOLLING AFB • MARCH AFB
B-25 • MATHER AFB • TYNDALL AFB • CARSWELL AFB
B-26 • LONG BEACH, CALIF. • WRIGHT-PATTERSON AFB
B-29 • McCLELLAN AFB • KIRTLAND AFB



FIGHTER

F-51 • NELLIS AFB • KIRTLAND AFB • TURNER AFB
F-80 • WILLIAMS AFB • WRIGHT-PATTERSON AFB
F-82 • MOSES LAKE AFB

CARGO

C-45 • WRIGHT-PATTERSON AFB • O'HARE INTERNAT'L, ILL. • ATTERBURY AFB
C-46 • O'HARE INTERNAT'L, ILL.
C-47/53 • SCOTT AFB • HAMILTON AFB • RAPID CITY AFB
C-54 • WESTOVER AFB • TINKER AFB

TRAINER AND MISCELLANEOUS

T-6 • WILLIAMS AFB • KEESLER AFB • MITCHEL AFB
MISC. • CASTLE AFB • KELLY AFB • WASHINGTON NAT'L.

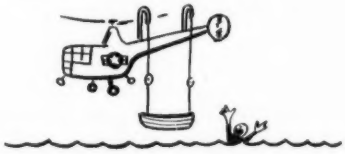
A REVISED PROGRAM OF FLYING SAFETY AWARDS IS BEING DEVELOPED TO INCLUDE TYPES OF AIRCRAFT NOT PREVIOUSLY CONTAINED IN AF LETTER 62-3 DATED 1 JULY 1947. SUITABLE AWARDS ARE BEING DESIGNED TO REPLACE THE PENNANTS. (U)

New Model Stratojet — Following a USAF order for additional numbers of advanced B-47's, Boeing has begun production tooling on an advanced model Stratojet. The new model, externally very similar to the two B-47's already in operation and the 10 B-47's under construction at Boeing, will have longer range and increased load capacity, droppable wing tanks, and the latest bombing and navigational radar. They will also be equipped with rocket-assist takeoff equipment. Equipped with six GE J-47 turbojet engines, the new model Stratojet will have 30% more power than the XB-47. An additional supply of fuel will increase the operational range.

Greater Payload for C-97's—Identical in appearance to the C-97 Stratofreighter, the new model C-97 troop and cargo transport ordered by the USAF will feature a greater payload and additional loading facilities. The new airplane will be powered by four Pratt and Whitney 3500-horsepower engines and capable of carrying a maximum payload of 68,000 pounds. Other new features include a large cargo door entering the upper deck just aft of the control cabin to facilitate freight handling. The new door will be in addition to the huge rear cargo doors and ramp which allow self-propelled entrance of trucks and light tanks. The C-97 is in regular service with MATS and SAC.

New Navy Flying Boat—Test flights of the Navy's new XP5Y-1 long range flying boat have been successfully completed at San Diego. The XP5Y-1 is the world's first turboprop flying boat and at 350 mph is the fastest airplane of its type yet built. Powered by four Allison XT40-A-4 gas turbine engines combining contra-rotating propeller drive and jet thrust, a total of 22,000 horsepower is developed to provide the 60-ton flying boat with high performance. The new flying boat is designed for long range search-rescue and anti-submarine missions and can carry bombs and other weapons.

CAA Requests Flight Plans—Civil Aeronautics Administration has asked voluntary filing of flight plans by civilian pilots entering newly activated air defense areas. The procedure is part of a cooperative program between CAA, the Defense Department and civil aviation groups. CAA will transmit to the Air Force information on aircraft penetrating defense areas to minimize the need for in-flight identification by fighter planes.



Life Rafts On H-5 Requested — Air Rescue Service has requested authorization to install external multi-placed life rafts on Sikorsky H-5 aircraft. Designed for dropping to survivors of aircraft accidents which happen over water, the rafts could also be used by the helicopter crew and passengers in the event of engine failure on over-water flights.

Thunderjet Range Increased — The combat radius of the F-84 has been increased to more than 1000 miles by the installation of two 230-gallon fuel tanks mounted on bomb shackles beneath the wings. These tanks are in addition to the two 230-gallon wingtip tanks which can be carried on F-84E Thunderjets.

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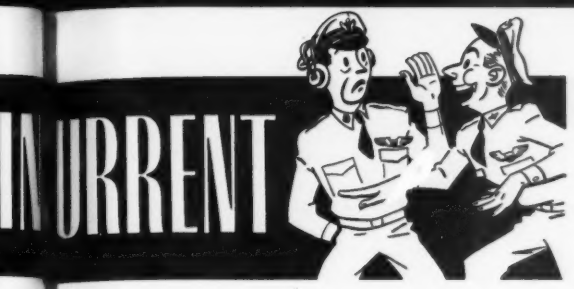
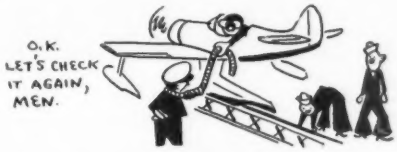
Ground Operation of Jets — Jet operating problems are not all in the air. According to airline officials with an eye toward future jet transport operation, there is a need developing to modify aircraft design, ground facilities and operating procedures as a result of practical tests to solve such problems as the threat of jet exhaust damage, special engine starting facilities, the need for special runup areas, the problem of spacing between taxiing jet aircraft and so on. These are only a few of many reasons for early exploration of the problems.



New Mail Service—Air parcel post service is now available between the United States and Japan. Time saved over surface shipping is three weeks.

USAF Orders More SA-16's — USAF has ordered additional Grumman SA-16 amphibian planes for Air Rescue Service to bring to 110 the number of SA 16's assigned to ARS. The plane can be equipped with two one-thousand-pound thrust RATO (rocket assist take-off) units for rough water takeoff. It can carry either 10 litter patients or 12 passengers in addition to a crew of six.



'Noose' of Naval Aviation — A new "western-style" system to prevent premature catapult takeoffs has been reported by the Naval Aviation News. The pilot in the plane to be catapulted holds in his hand a rope, the other end of which is tied in a noose and placed around the neck of the officer responsible for giving the signal that sets off the catapult. No statistics were available at press time as to the efficiency of the new system.

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RTCA Transition System — By 1953, essential items of the proposed transition system for air navigation aids will be installed and working in reasonable numbers. The original belief was that VHF omnirange courses could be established five miles apart. However, limitations of equipment have indicated that courses should be 15 to 20 miles apart and that a minimum 15 degrees will be necessary between courses to give adequate lateral separation. All four course low frequency ranges are expected to be replaced by 1954.

Aviatrixes Increase — From pots and pans to pilots of planes seems to be the trend as indicated by the latest count of women in aviation. According to the latest CAA report, a marked gain is shown in the number of women taking an active part in the technical aspects of everyday aviation. There is now a total of 9678 women pilots compared to 5122 in July, 1945. Of the current list, 8115 held private pilot certificates; 1561 held commercial ratings and two had airline transport pilot ratings. California reported the largest number of women pilots with 1154. Texas was next with 473. Among other aeronautical ratings held by women are: 1811 air traffic control operators, 1221 ground instructors, 400 parachute technicians, 47 mechanics, 16 glider pilots and four dispatchers.

New Type Rocket — A rocket developed by an eastern aircraft manufacturer is designed to attain a maximum speed of 5800 mph. At this speed the moon could be reached in 41 and one-half hours.

Jet Traffic Control — Provided present traffic control procedures are tightened up, the jet transport can be operated in a mixed airport traffic control pattern with conventional type aircraft, the SAE National Aeronautical Meeting was told. It was pointed out that a landing assignment involving a delay of not over 10 minutes could be given for a three-hour flight. Under the proposed plan, a jet pilot making out a flight plan would be given a priority number; on the basis of the accepted flight plan the pilot would be given a current waiting time. This would allow the pilot a choice: he could either wait the allotted time on the ground before starting or take off with the hope that the control at his destination could accept him before time. If he arrived later, his priority would be higher and he would be received without delay.

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Plexiglass Notes—Primarily to prevent static build-up in flight, an Air Force tech order requires bonding of astrodomes . . . A probable fire hazard from the possibility of static discharge caused by cleaning plexiglas can be eliminated if cleaning is done after aircraft refueling.

Dangerous Cargo

With all instruments checked, and the packages set on the built-in vibration table, the heavy test chamber door is swung into place. Interior conditions of the test chamber can be changed to simulate exactly the conditions within a plane during flight.

UNLESS properly packaged, a cargo of ordinary mercury-filled thermometers being airlifted might prove to be more hazardous than a plane full of irritated rattlers on the loose.

If the thermometers were broken, the released mercury running around loose would eat a variety of holes in the aluminum of an airplane during a comparatively short flight. Nor is mercury the only dangerous cargo. Where air transportation is concerned, there are many other dangerous chemicals, as well. Pressure changes, the extreme cold of high altitude, aircraft vibration, and many other factors can cause definite reactions which increase the hazards of airlifting chemicals or other sensitive materiel.

While the problem of loose mercury was solved fairly easily, through specifying that thermometers and other mercury-filled items will be packed in outer containers of metal to retain the mercury should the items break, the search for a solution to the special problems of air transportation is a continuing project with the Packaging Branch of the Materials Laboratory, Engineering Division, at Wright-Patterson Air Force Base. A new test chamber recently installed at the laboratory is helping provide the answers by simulating flight conditions and providing actual statistics on what happens to a package when it is transported by air. With the answers provided, the Air Force technicians can then go about developing a "safe" package or container for the particular materiel.

The test chamber, looking like a large walk-in vault, can be changed from sea level to 50,000-foot altitude conditions in three minutes, and can have its temperature lowered 100 degrees in that same period of time. The operating temperature range of the test chamber extends from 165 degrees Fahrenheit above to 65 degrees Fahrenheit below zero. A specially designed vibration table installed in the floor of the chamber carries loads up to 1000 pounds and has cycles of 600 to 3600 vibrations a minute. The Wright Field chamber is the first to combine all three elements of temperature, altitude and vibration.

The Packaging Branch studies lists of "Dangerous-to-ship" items prepared by technical committees of Ordnance, Chemical Warfare and other groups within the Armed Services to determine the special characteristics of each product and its reaction to

air transportation is too hazardous for certain items, it's much ter to find out before the takeoff. Fires and explosions can ccur when the packaging of dangerous items is insufficient to ithstand vibrations of aircraft or extremes of altitude.

The gallon-size polyethylene container being ground under heel here eliminates hazards involved in transporting acids in glass bottles. The container shown here was designed to hold battery electrolyte. Bottles of various sizes are used for other acids.

temperature, altitude and vibration. The long list includes such well-known troublemakers as acetone, sulfuric and nitric acid, naphthas, varnishes, ethers, cleaning fluids, nitroglycerine, ammunition and certain photographic materials.

Special containers and special cushioning is prescribed to meet the specific needs of each item. Outer packages are generally made of metal, fiber and wood, while cushioning may be cellulose fiber, sponge rubber, fiber glass or curled hair and latex. Insulation is provided by cork, asbestos or any other material that will prevent the transfer of heat and cold to the contents of the package. In many cases, air space provides the most suitable insulation.

Packing for shipment on the ground is controlled by regulations set up by the Interstate Commerce Commission, but this same packaging is not always adequate for transportation by air. For surface shipment it is reasonably safe to put hydrofluoric acid into ordinary glass bottles packed in divided fiber board cartons. In flight those ordinary glass bottles are too much of a risk. The AMC Packaging Branch now specifies a pliable bottle of polyethylene. Such a bottle can be tossed around as a rubber ball. Polyethylene is also specified for an especially-designed container to hold battery electrolyte for spare aircraft batteries. This makes an acceptable-for-air-shipment package.

When a new package is designed, the packaged item is placed in the test chamber and taken on simulated flights. If the package is unable to survive the vibrations of the aircraft, or the extremes of altitude and temperature, the engineers know they need to revise their packaging requirements. Fire extinguishers and safety devices built into the test chamber provide protection in case any dangerous items catch fire or explode during the test.

A few items are so extremely dangerous in flight that they will be carried only in those rare instances when the Commanding Officer determines that the nature of the emergency outweighs the risk involved. For all other things, if a safe package can be devised, tests by the AMC Packaging Branch will prove its safety in the "simulated-flight" test chamber long before a pilot is ever asked to carry it on an actual run. *(U)*

PILOT-TO-FORECASTER

AIR WEATHER SERVICE, in conjunction with AACS, is attempting to improve and expand pilot-to-forecaster communications facilities.

Immediate plans call for implementation of the service to enable pilot-to-forecaster contact on those channels now being guarded at each AACS VHF station: 137.88 mc (Channel "C"), 121.5 mc (Channel "D"), and 132.3 mc (Navy Channel). For the more distant future, plans will no doubt include a separate channel to be used solely for this purpose.

Pilot-to-forecaster facilities were originally instituted for jet aircraft only, but *all* aircraft may utilize the facilities in an emergency.

Some points to consider in providing weather service for jet aircraft are those dealing with taking surface observations more frequently at jet bases when ceiling and/or visibility drop below certain minima, flying tactical weather reconnaissance in advance of all cross-country jet missions, and generally exhausting every effort to improve high-altitude wind, cloud and turbulence forecasts.

But the main problem, all agree, is to decrease the time required to transmit weather information, of whatever type, from the many stations in a given area to the pilot in flight. VHF pilot-to-forecaster facilities are doing just that. (U)

NOTE ON CANNIBALIZING

IN "New Lamps For Old," FLYING SAFETY, December, 1949, there was a paragraph titled "Cannibalizing is Dangerous," which stated:

"Each jet engine is a complete unit with all its accessories tested and adjusted to fit the particular engine and no other." This statement was erroneous, as certain replacement of accessories are affected by field maintenance activities.

The Maintenance Technical Section, Maintenance Division, Air Materiel Command offers the following comment on cannibalization of jet engines, which should be USAF maintenance policy:

"Cannibalizing of engines will not be considered as common practice, and will be avoided whenever possible. This practice will only be permitted as outlined by technical order directives for the engine affected and to avoid grounding of aircraft. When replacement assemblies are removed from serviceable spare engines an appropriate note will be made on the AF Form 60B stating reason for cannibalization. Upon availability of replacement assemblies they will be reinstalled on the engines cannibalized."

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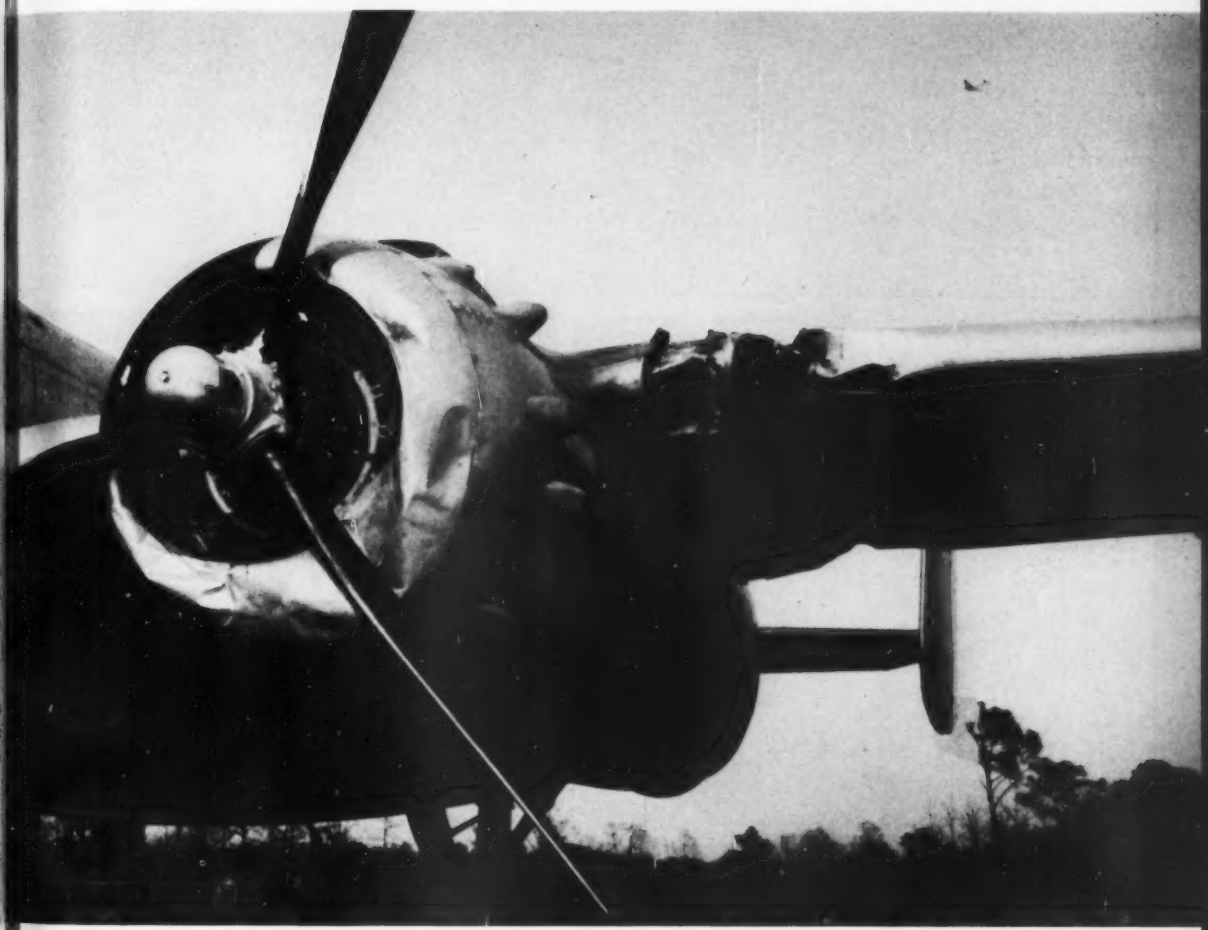
WHY?



THE weather was VFR for hundreds of miles around, but at this plane's destination low clouds had put the field on instruments.

The pilot, who held a 3-2 rating, contacted the tower and asked for approval to make a Ground Controlled Approach. The operating log showed that the pilot asked for the weather and was advised that the sky was obscured with visibility of one-half mile. The pilot was asked if he was still coming in and he answered in the affirmative, although no emergency existed and VFR alternates were available. The field's GCA minimums, published in the Radio Facility Charts and known to the pilot, are: Ceiling, 260 feet; visibility, 1½ miles.

On the final approach he was informed that he was 60 feet above the glide path, one and one-quarter miles from touchdown. He then descended rapidly and passed below the glide path and the GCA minimum altitude and was informed of this fact by the controller.

The plane struck a tree about 2700 feet from the end of the runway. An emergency pull-up was accomplished and during the climb, control of the left engine was lost. The runaway prop was feathered at 2,500 feet and the plane was flown on one engine to an alternate airport.

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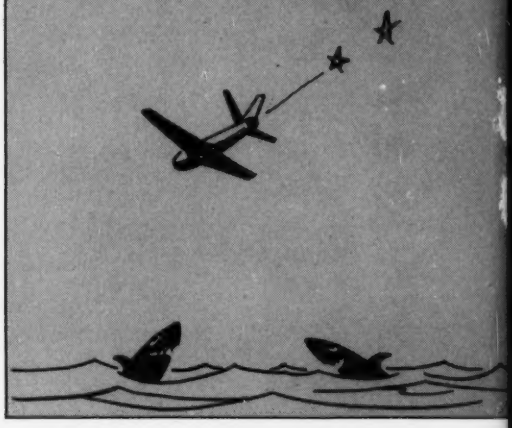
Mal Function

To be prepared for any fate
Is Air Force thought for current date.

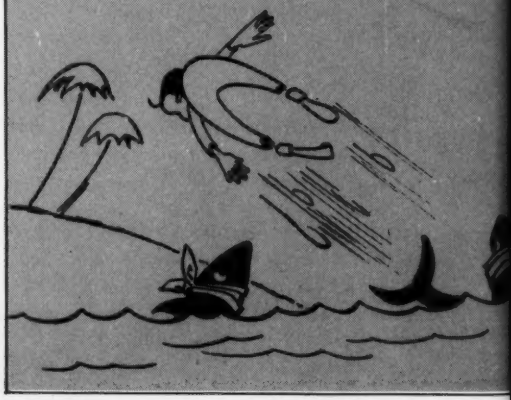
To travel light; be free as bird —
That's Mal's own version of the word.

Engine trouble, silly fool.
Handy sharks already drool.



Munching Mal is rather rough,
Sharks find head of Mal quite tough.

Fish toss Mal back on the beach
Too tough to eat; too dumb to teach.



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